

ABSTRACT OF THE DISCLOSURE

Leakage, capacitance and reliability degradation of interconnects fabricated in low-k dielectric materials, particularly porous low-k dielectric material, due to penetration by a barrier metal and/or barrier metal precursor during damascene processing is prevented by depositing a conformal, heat stable dielectric sealant layer on sidewalls of the low-k dielectric material defining the damascene opening. Embodiments include forming a dual damascene opening in a porous, low-k organosilicate layer, the organosilicate having a pendant silanol functional group, depositing a siloxane polymer having a silylating functional group which bonds with the pendant silanol group to form the sealant layer, depositing a Ta and/or TaN barrier metal layer by CVD or ALD and filling the opening with Cu or a Cu alloy.